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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/932,003	08/17/2001	Cem Basceri	MI22-1731	4185

21567 7590 05/22/2003

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EXAMINER

HUYNH, YENNHU B

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 05/22/2003

13

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/932,003

Applicant(s)

BASCERI, CEM

Examiner

Yennhu B Huynh

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                  | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

Art Unit: 2813

### **DETAILED ACTION**

This Office Action is in response to the Amendment filed on 2/14/03.

Claims Applicant's election without traverse of claims 1-23 in Paper No. 10 is acknowledged.

Claims 24-42 and 43-60 have been canceled by Amendment filed on 10/22/02 and 2/12/02.

#### ***Specification***

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Methods Of Forming Capacitor Constructions Comprising Perovskite-Type Dielectric Materials With Different Amount of Crystallinity Regions.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Ren et al. (U.S. 6,507,060 B2)

Ren et al. at figs.1-8 in col. 1-8 disclose a silicon base Pt/PZT/PT structure, which include:

-Re. claims 1-3: a first capacitor electrode 102; a perovskite type dielectric material 108/110/112 over the first capacitor electrode 104/106, the perovskite type dielectric material having a first edge region 108 proximate the first electrode and a portion further 110 from the first electrode than the first edge region, the portion having a ratio of lead from .09-1.1 % different amount of crystallinity than the first edge region having a ratio  $x = .9-1.1$  and  $y = .4-.6$ , wherein the degree of perovskite amorphous or crystallinity are related to the ratio of the Zr to the titanium contained in the film (fig.8, col. 5 lines 47-56 and col. 6, lines 41-43).

-Re. claim 4: wherein the perovskite type material comprises a second edge region 112 proximate the second capacitor electrode 14/116, wherein the portion 110 is between the first and second edge regions, and wherein the second edge region has an amount of crystallinity that is about the same as the first edge region (col.4, lines 50-56).

-Re. claims 5 & 6: wherein the perovskite type material has a same/different chemical composition in the portion than in the edge region (col.3, lines 19-60 and col. 5, lines 42-48 and col. 4, lines 50-56).

-Re. claims 14 & 15: wherein the first 104/106 and second 114/116 capacitor electrode layer comprises platinum (col. 3, lines 7-15 and col. 4, lines 15-24).

-Re. claims 10-12: wherein the perovskite type material comprises titanium and oxide together with lead and zirconium (cols. 3 & 4).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7-9 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ren et al. (U.S. 6,507,060 B2) in view of Summerfelt et al. (U.S. 6,362,068).

Ren et al. disclose substantially all of claimed invention, except wherein the perovskite type material comprises barium, strontium, titanium and oxygen throughout both the portion and edge region (cls. 7-9), and wherein the edge region and portion are together formed by an uninterrupted CVD process (cl. 13).

Summerfelt et al. at figs.1-5 in col. 1-8, disclose a electrode interface for high dielectric constant material, which include:

-Re. claim 7: wherein the perovskite type material has the same chemical composition in the portion 34 as in the edge region 32/36.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the invention of Ren et al. by incorporating the perovskite type material since it has the same chemical composition and therefore would be useful to obtain an uniform structure.

-Re. claim 9: wherein the perovskite type material comprises barium, strontium, titanium and oxygen throughout both the portion 34 and edge region 32/36 (cols.3 & 4, lines 22-31, Table 2).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the invention of Ren et al. by incorporating the perovskite type material comprised of barium, strontium, titanium and oxygen to obtain a high permittivity dielectric. .

-Re. claim 13: It would have been obvious to one skilled in the art to use an uninterrupted CVD process for both the edge region and the portion because it is within the level of ordinary skill to operate a process continuously. *In re Dilnot* 138 USPQ 248 (CCPA 1963); *In re Korpi* USPQ 229 (CCPA 1947); *In re Lincoln* 53 USPQ 40 (CCPA 1942).

Claims 16-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Summerfelt et al. (U.S. 6,362,068) in view of Jung (U.S. 6,337,496B2).

Summerfelt et al. at figs.1-5 in col. 1-8, disclose a electrode interface for high dielectric constant material, which include:

-Re. claims 16: a first capacitor electrode 30; a perovkite type dielectric material 32/34/36 over the first capacitor electrode, a second capacitor electrode 46 over the over the perovkite type dielectric material; wherein the perovkite type dielectric material

comprises a first region 32 physically against the first electrode, a second region 36 physically against the second electrode, and a region 34 between the first and second regions.

However, Summerfelt et al. do not disclose wherein the first and second region are amorphous and the between region is crystallized.

Jung disclose a ferroelectric capacitor, which include wherein the perovskite amorphous or crystallinity are related to the ratio of the Zr to the titanium contained in the PZT perovskite film (col.1, lines 46-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Summerfelt et al. by incorporating the first and second region are amorphous and the between region is crystallized, because the amorphous materials have less leakage than crystalline materials when formed against the metallic electrodes.

Jung also disclose:

-Re. claim 17: wherein the perovskite type material has a different chemical composition between the regions (col. 8 & 9, lines 16-29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Summerfelt et al. by incorporating a different composition to improve the perovskite crystal structure.

-Re. claim 18: wherein the perovskite type material has a same chemical composition between the regions (col. 8 & 9, lines 16-29).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Summerfelt et al. by incorporating a same composition to uniform the structure.

Summerfelt et al. also disclose:

-Re. claims 19-22: wherein the perovskite type material comprises barium, strontium, titanium, oxygenlead zirconium titanate and lanthanum doped lead zirconium titanate throughout both the portion 34 and edge region 32/36 (cols.3 & 4, lines 22-31, Table 2).

Summerfelt et al. do not disclose forming an uninterrupted CVD process for the edge region and portion are together (cl.23).

-Re. claim 23: It is obvious to one skilled in the art to form an uninterrupted CVD process for both the edge region and portion because it is within the level of ordinary skill to operate a process continuously. In re Dilnot 138 USPQ 248 (CCPA 1963); In re Korpi USPQ 229 (CCPA 1947); In re Lincoln 53 USPQ 40 (CCPA 1942).

Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection.



**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

YNBH,

5/1/03

  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800